Munich Cancer Registry

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ICD-10 C91: Lymphoid leukaemia

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	5,255
Diseases	5,262
Creation date	01/26/2021
Database export	01/07/2021
Population	4.92 m

Munich Cancer Registry
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC91__E-ICD-10-C91-Lymphoid-leukaemia-incidence-and-mortality.pdf

Index of figures and tables

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, January 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

Some remarks regarding this cancer type

The results for leukemias should be interpreted with caution. As with other primarily non-surgically or non-radiologically treated cancer diseases, the MCR hardly manages to obtain even the simplest information on this cancer. The proportion of DCO cases indicates a situation that is far away from a satisfying cooperation. In the group of institutions that potentially participate in reporting are a few hospitals that refuse any contribution to MCR.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C91.-	Lymphoid leukaemia
C91.0	Acute lymphoblastic leukaemia [ALL]
C91.1	Chronic lymphocytic leukaemia of B-cell type
C91.3	Prolymphocytic leukaemia of B-cell type
C91.4	Hairy-cell leukaemia
C91.5	Adult T-cell lymphoma/leukaemia (HTLV-1-associated)
C91.6	Prolymophocytic leukaemia of T-cell type
C91.7	Other lymphoid leukaemia
C91.8	Mature B-cell leukaemia Burkitt-type
C91.9	Lymphoid leukaemia, unspecified

INCIDENCE

Table 1

Cases by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS) (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	153	38	24.8	11.8	16.6	78.4	97.4
1999	136	19	14.0	12.5	16.6	67.6	97.8
2000	138	23	16.7	11.5	16.6	71.7	97.1
2001	183	46	25.1	11.6	16.4	74.9	96.2
2002	298	83	27.9	12.0	16.3	76.5	96.0 #
2003	268	70	26.1	12.2	16.1	71.6	96.3
2004	296	58	19.6	12.8	16.1	66.2	93.2
2005	288	65	22.6	13.5	16.0	67.7	94.4
2006	289	44	15.2	14.5	15.6	66.1	94.5
2007	339	62	18.3	14.8	14.9	63.1	92.9 #
2008	307	58	18.9	15.5	15.0	61.2	99.7
2009	320	53	16.6	15.9	14.3	56.3	97.8
2010	303	61	20.1	16.3	13.6	62.0	98.0
2011	305	57	18.7	17.0	13.3	52.8	98.4
2012	319	59	18.5	17.2	12.7	53.0	97.2
2013	292	55	18.8	17.5	11.7	53.1	95.2
2014	233	57	24.5	17.7	11.2	57.5	96.1
2015	228	52	22.8	18.1	10.4	52.6	96.5
2016	211	55	26.1	18.2	9.3	47.9	97.6
2017	204	73	35.8	18.7	7.9	51.0	99.0
2018	104	7	6.7	19.0	6.3	24.0	96.2
2019	48	2	4.2	19.2	2.3	27.1	81.3 ##
1998-2019	5262	1097	20.8	19.2	16.6	60.9	96.3

5,262 cases diagnosed 1998-2019 are related to a total of 5,255 patients. Currently, in 1,774 (33.8 %) of these 5,255 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,285 / 340 / 149 (24.5 % / 6.5 % / 2.8 %) patients exist having 2 / 3 / 4+ malignancies.

\# The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

\## Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 204 cases has been diagnosed, of which 18.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 7.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (MALES) (incl. DCO)

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	89	58.2	19	21.3	13.5	19.1	76.4	95.5
1999	71	52.2	10	14.1	13.1	19.1	74.6	100.0
2000	84	60.9	13	15.5	11.5	19.0	72.6	96.4
2001	102	55.7	22	21.6	11.8	18.7	75.5	95.1
2002	172	57.7	37	21.5	12.4	18.6	73.3	94.2 #
2003	166	61.9	34	20.5	12.9	18.3	69.3	96.4
2004	179	60.5	30	16.8	13.3	18.0	67.6	91.6
2005	180	62.5	37	20.6	14.1	17.9	68.9	95.0
2006	184	63.7	24	13.0	15.6	17.5	65.8	94.0
2007	193	56.9	21	10.9	15.6	16.9	62.7	92.7 #
2008	182	59.3	27	14.8	16.1	16.9	58.2	100.0
2009	182	56.9	24	13.2	16.5	16.2	53.8	97.8
2010	179	59.1	33	18.4	16.9	15.0	61.5	97.8
2011	178	58.4	27	15.2	17.7	14.6	52.2	99.4
2012	186	58.3	28	15.1	17.8	13.2	51.1	96.8
2013	175	59.9	33	18.9	18.2	12.1	50.3	95.4
2014	151	64.8	27	17.9	18.3	11.7	54.3	96.7
2015	139	61.0	24	17.3	18.8	10.5	48.9	97.1
2016	126	59.7	29	23.0	18.8	8.7	42.9	99.2
2017	122	59.8	41	33.6	19.5	7.6	50.0	100.0
2018	58	55.8	6	10.3	19.9	3.8	29.3	98.3
2019	27	56.3	1	3.7	20.0	0.0	25.9	81.5 ##
1998-2019	3125	59.4	547	17.5	20.0	19.1	59.7	96.3

3,125 cases diagnosed 1998-2019 are related to a total of 3,120 patients. Currently, in 1,141 (36.6 %) of these 3,120 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 805 / 222 / 114 (25.8 % / 7.1 % / 3.7 %) patients exist having 2 / 3 / 4+ malignancies.

\# The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

\## Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 122 cases has been diagnosed, of which 19.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 7.6 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases by year of diagnosis, proportions of
DCO, further malignancies, deaths, and active follow-up (FEMALES)
(incl. DCO)

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	64	41.8	19	29.7	9.4	12.9	81.3	100.0	
1999	65	47.8	9	13.8	11.6	13.1	60.0	95.4	
2000	54	39.1	10	18.5	11.5	12.9	70.4	98.1	
2001	81	44.3	24	29.6	11.4	12.9	74.1	97.5	
2002	126	42.3	46	36.5	11.5	12.9	81.0	98.4	#
2003	102	38.1	36	35.3	11.2	12.9	75.5	96.1	
2004	117	39.5	28	23.9	12.2	13.3	64.1	95.7	
2005	108	37.5	28	25.9	12.7	13.2	65.7	93.5	
2006	105	36.3	20	19.0	12.9	12.8	66.7	95.2	
2007	146	43.1	41	28.1	13.6	12.1	63.7	93.2	#
2008	125	40.7	31	24.8	14.6	12.3	65.6	99.2	
2009	138	43.1	29	21.0	14.9	11.5	59.4	97.8	
2010	124	40.9	28	22.6	15.5	11.5	62.9	98.4	
2011	127	41.6	30	23.6	16.1	11.5	53.5	96.9	
2012	133	41.7	31	23.3	16.3	12.0	55.6	97.7	
2013	117	40.1	22	18.8	16.5	11.0	57.3	94.9	
2014	82	35.2	30	36.6	16.9	10.4	63.4	95.1	
2015	89	39.0	28	31.5	17.0	10.2	58.4	95.5	
2016	85	40.3	26	30.6	17.3	10.2	55.3	95.3	
2017	82	40.2	32	39.0	17.5	8.5	52.4	97.6	
2018	46	44.2	1	2.2	17.7	9.7	17.4	93.5	
2019	21	43.8	1	4.8	17.9	5.6	28.6	81.0	##
1998-2019	2137	40.6	550	25.7	17.9	12.9	62.5	96.3	

2,137 cases diagnosed 1998-2019 are related to a total of 2,135 patients. Currently, in 633 (29.6 %) of these 2,135 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 480 / 118 / 35 (22.5 % / 5.5 % / 1.6 %) patients exist having 2 / 3 / 4+ malignancies.

\# The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2017, a subgroup of 82 cases has been diagnosed, of which 17.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 8.5 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	89	64	8.0	5.4	5.8	2.9	7.6	3.8	9.2	4.6
1999	71	65	6.3	5.5	4.6	4.4	6.0	4.7	7.3	4.9
2000	84	54	7.4	4.5	5.5	2.9	7.0	3.4	8.0	3.8
2001	102	81	8.8	6.7	6.6	4.1	8.4	4.9	9.7	5.5
2002	172	126	9.2	6.4	6.4	3.1	8.2	4.2	9.8	5.2
2003	166	102	8.9	5.2	6.1	3.1	7.8	3.7	9.5	4.3
2004	179	117	9.5	5.9	6.7	3.5	8.3	4.3	9.9	4.9
2005	180	108	9.5	5.4	6.7	3.3	8.3	3.9	10.1	4.6
2006	184	105	9.6	5.2	6.8	3.1	8.4	3.7	9.8	4.3
2007	193	146	8.7	6.3	5.5	4.0	7.2	4.6	8.9	5.2
2008	182	125	8.2	5.4	5.8	3.2	6.9	3.7	8.0	4.3
2009	182	138	8.2	5.9	4.7	3.4	6.5	4.1	7.9	4.7
2010	179	124	7.9	5.3	5.0	3.0	6.4	3.5	7.8	4.1
2011	178	127	8.0	5.4	5.3	3.2	6.5	3.7	7.5	4.1
2012	186	133	8.2	5.6	5.5	3.9	6.5	4.2	7.9	4.5
2013	175	117	7.6	4.9	4.8	2.9	5.9	3.5	7.1	4.0
2014	151	82	6.5	3.4	3.7	1.4	4.9	1.9	6.0	2.5
2015	139	89	5.8	3.7	2.9	1.6	4.1	2.2	5.3	2.7
2016	126	85	5.2	3.5	2.6	1.2	3.7	1.9	4.8	2.4
2017	122	82	5.1	3.3	2.2	1.1	3.4	1.7	4.4	2.3
2018	58	46	2.4	1.9	1.2	0.9	1.7	1.3	2.2	1.5
2019	27	21	1.1	0.8	0.6	0.4	0.8	0.6	1.0	0.7
1998-2019	3125	2137	7.1	4.7	4.5	2.6	5.8	3.2	6.9	3.7

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	153	64.4	20.4	1.4	95.8	39.8	57.7	67.1	77.9	85.2
1999	136	59.1	23.5	0.3	104	6.3	54.5	63.6	75.0	80.5
2000	138	62.1	20.7	2.1	91.2	38.5	55.7	65.3	74.9	85.1
2001	183	62.8	22.1	1.4	94.0	34.3	56.2	67.0	76.3	87.3
2002	298	65.7	20.3	2.6	95.0	37.0	60.5	68.7	78.9	87.9
2003	268	64.2	22.4	0.3	98.9	29.5	57.5	68.9	78.9	85.6
2004	296	62.5	21.9	1.4	98.6	29.0	55.7	66.7	77.3	84.5
2005	288	63.3	23.8	0.6	97.1	20.3	57.6	70.2	78.0	85.1
2006	289	63.9	22.9	1.3	95.4	19.3	58.4	69.3	78.3	85.6
2007	339	64.5	22.0	0.3	99.8	30.3	57.1	69.1	80.1	86.1
2008	307	63.7	24.0	0.4	97.4	13.9	60.5	69.8	79.2	86.2
2009	320	66.0	20.1	1.3	98.6	43.2	57.9	70.0	80.0	86.5
2010	303	65.8	23.5	0.3	101	31.8	56.6	72.3	81.7	88.4
2011	305	64.1	24.0	2.5	101	13.6	56.4	70.8	80.2	87.5
2012	319	62.5	25.5	0.6	102	13.0	53.4	71.1	80.5	87.1
2013	292	64.6	22.8	0.1	100	25.0	57.2	71.2	78.9	87.2
2014	233	68.7	19.3	2.7	98.3	43.8	60.9	72.5	81.3	90.0
2015	228	69.7	17.3	4.9	96.6	49.9	63.0	73.9	80.1	87.7
2016	211	70.8	16.3	17.5	97.5	49.0	63.5	75.0	81.2	88.2
2017	204	73.4	14.3	26.8	97.4	52.3	67.0	75.6	84.0	89.0
2018	104	66.1	16.2	18.5	90.8	42.8	55.7	71.0	78.0	82.6
2019	48	66.4	17.8	20.2	97.6	47.5	55.3	69.2	79.0	86.1
1998–2019	5262	65.1	21.8	0.1	104	34.3	57.9	70.3	79.5	86.8

Table 3a

Age distribution parameters by year of diagnosis (MALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	89	61.6	21.1	2.0	95.8	37.1	54.9	64.6	74.9	83.8
1999	71	60.5	21.7	0.3	89.4	31.9	54.2	63.1	77.0	82.6
2000	84	61.1	19.2	2.6	91.1	43.8	55.3	64.5	71.6	80.2
2001	102	59.7	20.3	1.4	90.7	36.8	52.3	64.5	72.4	79.2
2002	172	62.0	20.9	2.6	90.9	31.1	55.7	66.3	75.5	82.5
2003	166	62.4	21.2	1.6	90.7	29.5	56.3	67.1	76.1	83.1
2004	179	60.7	21.8	1.4	95.2	25.6	55.4	64.7	75.0	81.9
2005	180	62.1	23.5	0.7	94.6	17.9	56.2	68.8	77.2	82.9
2006	184	62.3	22.9	1.3	95.4	19.3	56.9	68.2	77.5	84.1
2007	193	64.2	19.4	0.3	97.8	39.9	56.8	68.7	77.2	83.3
2008	182	61.7	24.3	0.4	93.7	11.8	60.0	69.4	77.0	83.0
2009	182	66.2	17.4	2.2	97.0	48.2	58.0	69.7	77.5	84.4
2010	179	64.4	23.0	0.3	101	31.6	53.8	71.3	80.5	87.0
2011	178	62.4	22.9	2.5	101	16.5	54.3	68.9	77.7	84.4
2012	186	62.7	24.6	2.4	95.2	14.9	57.4	71.0	79.6	84.7
2013	175	64.0	22.4	2.3	100	24.2	54.3	70.8	78.3	86.7
2014	151	66.4	19.1	3.7	95.9	43.8	58.3	70.4	78.5	85.4
2015	139	69.0	16.9	4.9	96.6	51.5	62.3	74.4	79.6	85.2
2016	126	68.8	16.6	17.5	97.5	47.9	59.7	73.8	80.1	87.3
2017	122	71.8	14.8	26.8	93.8	49.6	65.3	74.8	83.1	88.4
2018	58	66.3	17.0	18.5	89.1	39.7	56.2	72.8	77.8	82.8
2019	27	68.9	15.7	20.2	97.6	51.5	60.9	71.5	79.9	86.1
1998–2019	3125	63.8	21.1	0.3	101	34.4	56.8	69.0	77.7	84.4

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	64	68.3	18.8	1.4	93.9	45.2	61.6	73.7	79.2	86.7
1999	65	57.7	25.3	1.5	104	4.1	55.1	63.7	74.0	78.2
2000	54	63.6	23.0	2.1	91.2	38.5	58.2	68.2	77.4	86.5
2001	81	66.6	23.7	2.8	94.0	34.3	61.5	72.0	82.6	90.4
2002	126	70.8	18.3	2.9	95.0	49.5	63.9	74.1	83.5	90.1
2003	102	67.3	24.2	0.3	98.9	47.3	59.4	73.6	81.7	90.6
2004	117	65.3	21.7	4.3	98.6	35.3	58.1	69.4	80.2	87.3
2005	108	65.2	24.2	0.6	97.1	20.8	62.4	74.0	79.7	88.8
2006	105	66.6	22.7	2.5	93.9	32.7	61.2	72.8	81.3	86.6
2007	146	64.8	25.0	1.0	99.8	13.3	57.8	70.9	82.5	87.6
2008	125	66.6	23.5	1.4	97.4	22.0	60.9	71.3	82.6	88.3
2009	138	65.8	23.2	1.3	98.6	28.2	57.5	71.2	82.9	87.6
2010	124	67.7	24.2	0.8	97.5	32.6	61.1	74.7	84.2	89.5
2011	127	66.3	25.3	2.5	96.7	13.1	57.8	73.3	83.7	89.7
2012	133	62.3	26.8	0.6	102	12.6	51.1	71.3	82.8	88.7
2013	117	65.5	23.6	0.1	97.9	27.3	61.4	71.5	81.5	90.4
2014	82	73.0	19.1	2.7	98.3	47.1	66.7	77.0	86.5	91.6
2015	89	70.8	18.0	5.0	95.9	43.1	64.9	73.9	82.7	91.8
2016	85	73.9	15.5	28.4	96.0	52.5	67.7	76.5	85.1	89.2
2017	82	75.8	13.3	41.3	97.4	55.9	67.8	77.6	86.1	90.7
2018	46	65.9	15.2	32.9	90.8	44.8	55.1	70.1	78.2	81.9
2019	21	63.2	20.2	21.2	93.8	31.4	51.7	65.8	78.6	82.2
1998–2019	2137	67.0	22.6	0.1	104	33.9	60.4	72.8	82.2	88.9

Table 4

Age distribution by 5-year age group and sex for period 2007-2019
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	92	2.9	2.9	54	2.8	2.8	38	2.9	2.9
5-9	61	1.9	4.8	31	1.6	4.5	30	2.3	5.2
10-14	39	1.2	6.0	22	1.2	5.6	17	1.3	6.5
15-19	38	1.2	7.2	23	1.2	6.8	15	1.1	7.6
20-24	27	0.8	8.0	17	0.9	7.7	10	0.8	8.4
25-29	25	0.8	8.8	13	0.7	8.4	12	0.9	9.3
30-34	32	1.0	9.8	16	0.8	9.3	16	1.2	10.5
35-39	38	1.2	11.0	24	1.3	10.5	14	1.1	11.6
40-44	66	2.1	13.0	34	1.8	12.3	32	2.4	14.0
45-49	100	3.1	16.1	74	3.9	16.2	26	2.0	16.0
50-54	140	4.4	20.5	97	5.1	21.3	43	3.3	19.2
55-59	196	6.1	26.6	123	6.5	27.8	73	5.6	24.8
60-64	232	7.2	33.8	138	7.3	35.1	94	7.1	31.9
65-69	370	11.5	45.3	237	12.5	47.6	133	10.1	42.1
70-74	469	14.6	59.9	300	15.8	63.4	169	12.9	54.9
75-79	441	13.7	73.6	278	14.6	78.0	163	12.4	67.3
80-84	378	11.8	85.4	223	11.7	89.8	155	11.8	79.1
85+	469	14.6	100.0	194	10.2	100.0	275	20.9	100.0
All ages	3213	100.0		1898	100.0		1315	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2019

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=321 %	Females DCO rate n=329 %	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4	54	38	3.6	2.7		2.6	25.6	23.6
5- 9	31	30	2.1	2.2	3.2		27.2	32.3
10-14	22	17	1.5	1.2			16.5	14.5
15-19	23	15	1.4	1.0		6.7	7.7	6.1
20-24	17	10	0.9	0.6		10.0	2.9	2.1
25-29	13	12	0.6	0.6		8.3	1.5	1.1
30-34	16	16	0.8	0.8	6.3	6.3	1.3	0.8
35-39	24	14	1.1	0.7		7.1	1.4	0.4
40-44	34	32	1.5	1.4			1.3	0.6
45-49	74	26	2.9	1.1			1.5	0.3
50-54	97	43	4.1	1.9	3.1	4.7	1.2	0.4
55-59	123	73	6.3	3.7	4.9	1.4	1.0	0.6
60-64	138	94	8.5	5.4	5.8	6.4	0.8	0.6
65-69	237	133	15.6	7.9	8.0	8.3	1.0	0.7
70-74	300	169	21.4	10.5	9.7	10.7	1.2	0.9
75-79	277	163	25.0	11.8	17.7	21.5	1.3	0.9
80-84	223	154	34.0	15.8	30.9	41.6	1.6	1.1
85+	194	275	45.5	28.5	70.1	67.6	2.0	1.8
All ages	1897	1314			16.9	25.0	1.3	0.9
Incidence								
Raw			6.3	4.2				
WS			3.8	2.3				
ES			4.8	2.8				
BRD-S			5.9	3.3				

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

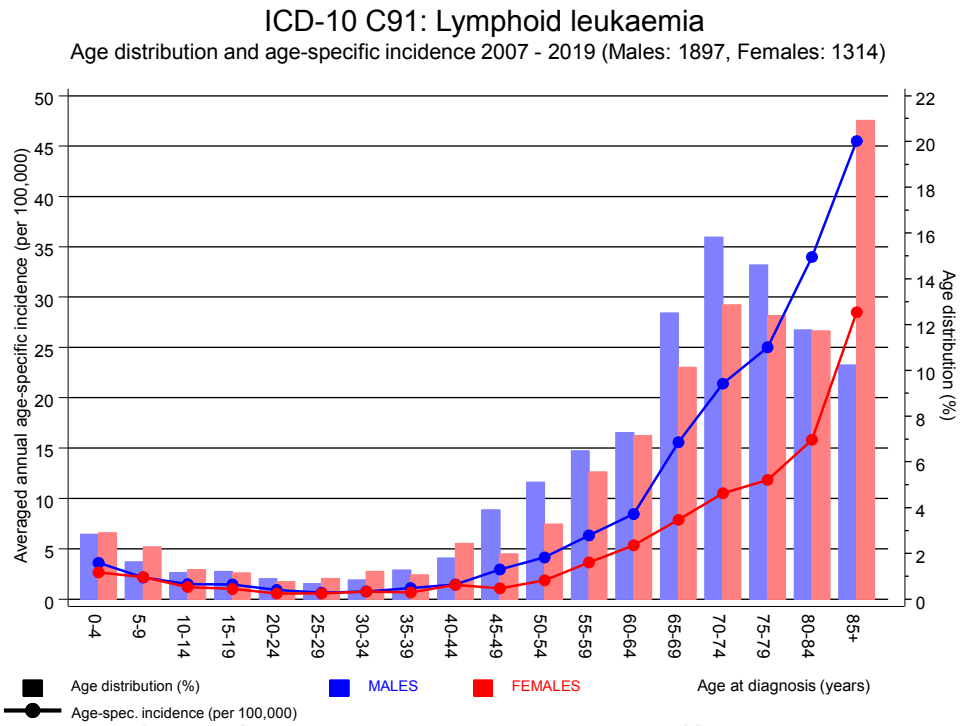


Figure 6. Age distribution (males: mean=65.3 yrs, median=70.7 yrs; females: mean=67.5 yrs, median=73.3 yrs) and age-specific incidence.

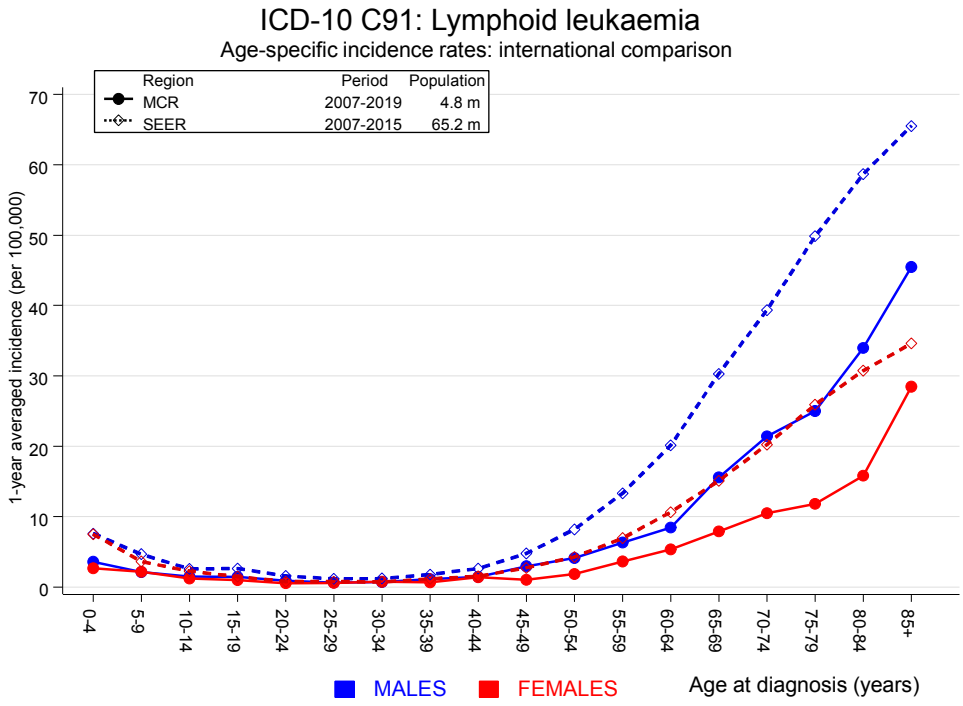


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 submission. http://www.seer.cancer.gov.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C00	Lip	3	0.2	14.1	2.9	41.1	#	2.3	
C03–C06	Oral cavity	3	1.5	2.0	0.4	5.8		1.2	
C07–C08	Salivary gland	6	0.4	13.8	5.1	30.0	#	4.6	
C09–C10	Oropharynx	2	1.8	1.1	0.1	3.9		0.1	
C12–C13	Hypopharynx	2	1.0	2.0	0.2	7.1		0.8	
C15	Oesophagus	7	3.6	1.9	0.8	4.0		2.8	
C16	Stomach	18	7.4	2.4	1.4	3.8	#	8.7	
C17	Small intestine	3	1.1	2.7	0.6	7.9		1.6	
C18	Colon	37	18.2	2.0	1.4	2.8	#	15.5	2.7
C19–C20	Rectum	27	9.9	2.7	1.8	4.0	#	14.1	
C22	Liver	10	5.5	1.8	0.9	3.4		3.7	10.0
C25	Pancreas	14	7.4	1.9	1.0	3.2	#	5.5	
C33–C34	Lung	60	22.2	2.7	2.1	3.5	#	31.1	6.7
C38,C45	Mesothelioma	2	1.3	1.5	0.2	5.4		0.5	50.0
C43	Malign. melanoma	42	8.4	5.0	3.6	6.8	#	27.7	
C44	Skin others	2	0.1	38.3	4.6	138.3	#	1.6	
C46,C49	Soft tissue	5	1.1	4.7	1.5	11.0	#	3.2	
C50	Breast	2	0.5	3.9	0.5	14.1		1.2	
C60	Penis	3	0.5	6.3	1.3	18.5	#	2.1	
C61	Prostate	111	53.4	2.1	1.7	2.5	#	47.4	3.6
C62	Testis	3	0.5	6.1	1.3	17.9	#	2.1	
C64	Kidney	16	6.5	2.5	1.4	4.0	#	7.8	
C65	Renal pelvis	3	0.9	3.5	0.7	10.3		1.8	
C67	Bladder	20	8.8	2.3	1.4	3.5	#	9.2	
C70–C72	CNS cancer	12	2.4	5.0	2.6	8.8	#	7.9	8.3
C73	Thyroid	4	1.2	3.4	0.9	8.7		2.3	
C76–C79	CUP	7	3.2	2.2	0.9	4.5		3.1	
C81	Hodgkin lymphoma	7	0.5	15.5	6.2	32.0	#	5.4	
C82–C85	NHL	39	8.1	4.8	3.4	6.6	#	25.5	7.7
C90	Mult. myeloma	7	2.5	2.8	1.1	5.7	#	3.7	
C91–C96	Leukaemia	13	2.9	4.4	2.4	7.6	#	8.3	23.1
Others, specified		8	4.0	2.0	0.9	3.9		3.3	
Not observed		0	3.0	0.0	0.0	1.2		−2.5	
All further malignancies		498	190.1	2.6	2.4	2.9	#	253.6	3.6

Patients	2626
Median age at next malignancy (years)	73.1
Person-years	12138
Mean observation time (years)	4.6
Median observation time (years)	3.5

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 are pooled in category “Others, specified”.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C00	Lip	1	0.1	17.5	0.4	97.4		1.3	
C03–C06	Oral cavity	2	0.4	4.6	0.6	16.7		2.2	
C07–C08	Salivary gland	2	0.1	15.8	1.9	57.0	#	2.6	
C09–C10	Oropharynx	2	0.3	6.8	0.8	24.5		2.4	
C14	ENT cancer	1	0.0	80.6	2.0	448.8	#	1.4	
C15	Oesophagus	1	0.5	2.0	0.1	11.3		0.7	
C16	Stomach	5	2.7	1.9	0.6	4.4		3.2	
C18	Colon	18	7.6	2.4	1.4	3.7	#	14.4	11.1
C19–C20	Rectum	7	3.1	2.3	0.9	4.6		5.4	14.3
C21	Anus/canal	4	0.4	9.7	2.6	24.8	#	5.0	
C22	Liver	3	1.0	3.1	0.6	9.1		2.8	33.3
C23–C24	Bile	2	1.1	1.8	0.2	6.4		1.2	
C25	Pancreas	10	3.7	2.7	1.3	5.0	#	8.8	10.0
C33–C34	Lung	25	5.8	4.3	2.8	6.4	#	26.6	8.0
C43	Malign. melanoma	11	2.8	3.9	2.0	7.0	#	11.4	
C46,C49	Soft tissue	1	0.4	2.3	0.1	12.6		0.8	
C48	Peritoneal	1	0.3	3.2	0.1	17.8		1.0	
C50	Breast	56	22.7	2.5	1.9	3.2	#	46.1	
C53	Cervix uteri	1	0.9	1.1	0.0	6.2		0.1	
C54	Corpus uteri	11	4.3	2.6	1.3	4.6	#	9.3	
C56	Ovary	8	3.1	2.6	1.1	5.1	#	6.8	
C64	Kidney	8	1.9	4.3	1.8	8.4	#	8.5	
C67	Bladder	1	1.5	0.7	0.0	3.7		−0.7	
C69	Eye lymphoma	1	0.0	43.6	1.1	243.1	#	1.4	
C70–C72	CNS cancer	3	1.0	2.9	0.6	8.6		2.7	
C73	Thyroid	8	1.2	6.9	3.0	13.7	#	9.5	
C76–C79	CUP	5	1.4	3.5	1.1	8.2	#	5.0	
C81	Hodgkin lymphoma	2	0.1	13.6	1.7	49.2	#	2.6	
C82–C85	NHL	30	3.1	9.7	6.6	13.9	#	37.3	6.7
C90	Mult. myeloma	4	1.0	4.1	1.1	10.4	#	4.2	
C91–C96	Leukaemia	6	1.2	5.1	1.9	11.2	#	6.7	
Not observed		0	3.1	0.0	0.0	1.2		−4.4	
All further malignancies		240	76.9	3.1	2.7	3.5	#	225.9	3.8

Patients	1624
Median age at next malignancy (years)	74.1
Person-years	7222
Mean observation time (years)	4.4
Median observation time (years)	3.0

The occurrence of further specified malignancy is statistically significant.

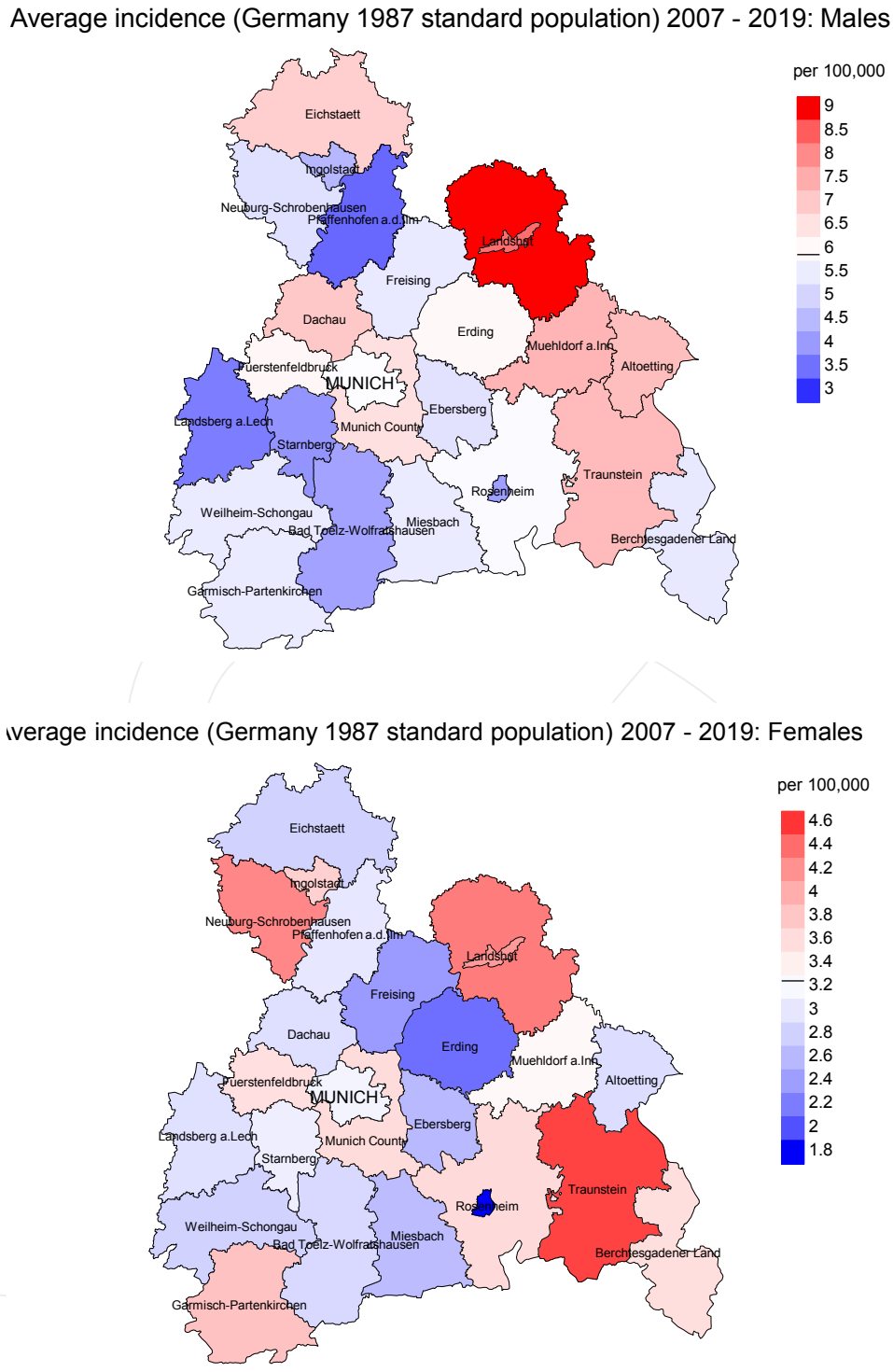
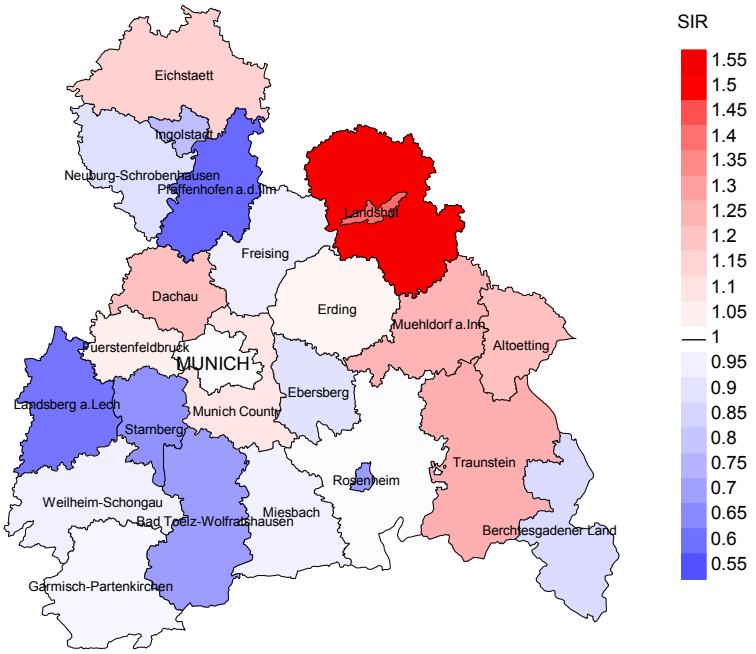


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.9/100,000 WS N=1,897, females 3.3/100,000 WS N=1,314).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 30 women were identified with newly diagnosed lymphoid leukaemia. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.6/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.5 and 4.2/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

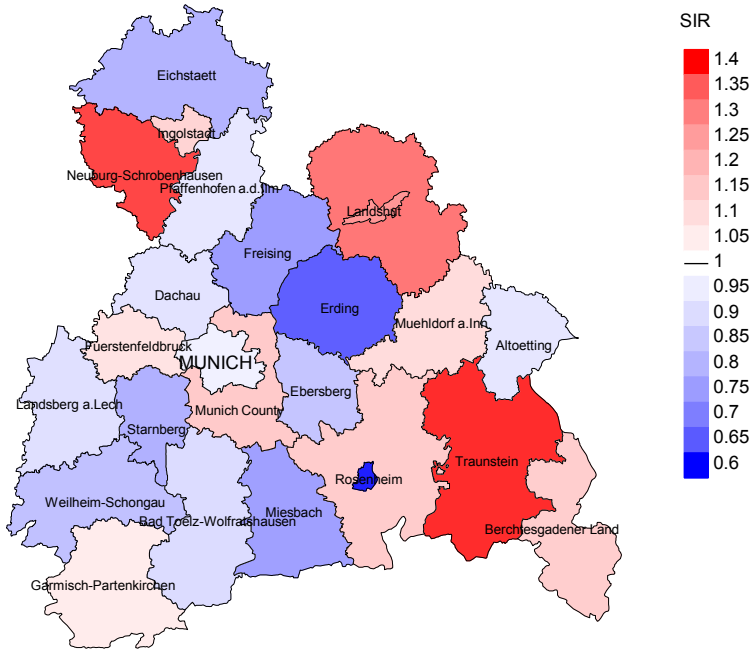


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,897, females N=1,314).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 30 women were identified with newly diagnosed lymphoid leukaemia. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.84. Though, the value of this parameter may vary with an underlying probability of 99% between 0.50 and 1.32, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	153	97.4	24.8	120	78.4	99.2
1999	136	97.8	14.0	92	67.6	96.7
2000	138	97.1	16.7	99	71.7	97.0
2001	183	96.2	25.1	137	74.9	96.4
2002	298	96.0	27.9	228	76.5	96.5
2003	268	96.3	26.1	192	71.6	96.9
2004	296	93.2	19.6	196	66.2	95.4
2005	288	94.4	22.6	195	67.7	96.9
2006	289	94.5	15.2	191	66.1	95.8
2007	339	92.9	18.3	214	63.1	94.9
2008	307	99.7	18.9	188	61.2	94.1
2009	320	97.8	16.6	180	56.3	95.6
2010	303	98.0	20.1	188	62.0	95.2
2011	305	98.4	18.7	161	52.8	95.0
2012	319	97.2	18.5	169	53.0	94.1
2013	292	95.2	18.8	155	53.1	93.5
2014	233	96.1	24.5	134	57.5	90.3
2015	228	96.5	22.8	120	52.6	92.5
2016	211	97.6	26.1	101	47.9	92.1
2017	204	99.0	35.8	104	51.0	88.5
2018	104	96.2	6.7	25	24.0	64.0
2019	48	81.3	4.2	13	27.1	61.5
1998–2019	5262	96.3	20.8	3202	60.9	94.6

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	153	87	98.9	38	24.8
1999	136	68	94.1	15	11.0
2000	138	73	94.5	24	17.4
2001	183	113	96.5	48	26.2
2002	298	153	98.7	92	30.9
2003	268	143	98.6	84	31.3
2004	296	140	99.3	61	20.6
2005	288	170	100.0	73	25.3
2006	289	162	98.1	61	21.1
2007	339	184	98.4	78	23.0
2008	307	185	98.9	65	21.2
2009	320	158	100.0	57	17.8
2010	303	184	99.5	77	25.4
2011	305	182	99.5	63	20.7
2012	319	203	99.0	69	21.6
2013	292	198	98.5	71	24.3
2014	233	199	99.0	65	27.9
2015	228	196	98.0	61	26.8
2016	211	200	99.0	67	31.8
2017	204	208	96.2	80	39.2
2018	104	141	34.0	15	14.4
2019	48	111	54.1	10	20.8
1998–2019	5262	3458	94.4	1274	24.2

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	87	56.3	43.7	95.3
1999	68	64.7	35.3	90.6
2000	73	63.0	37.0	98.6
2001	113	61.1	38.9	94.5
2002	153	77.8	22.2	96.0
2003	143	81.8	18.2	95.0
2004	140	85.7	14.3	95.0
2005	170	82.4	17.6	97.1
2006	162	79.0	21.0	93.1
2007	184	76.6	23.4	91.2
2008	185	82.7	17.3	90.7
2009	158	83.5	16.5	93.0
2010	184	79.3	20.7	94.0
2011	182	76.4	23.6	89.0
2012	203	78.8	21.2	90.0
2013	198	73.7	26.3	86.2
2014	199	69.3	30.7	85.8
2015	196	73.5	26.5	85.4
2016	200	69.0	31.0	87.9
2017	208	67.8	32.2	83.0
2018	141	47.5	52.5	77.1
2019	111	50.5	49.5	75.0
1998-2019	3458	73.3	26.7	90.4

Table 10a

Medians of age at death according to the grouping in Table 9
MALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	49	73.1	67.7	80.8	73.1
1999	40	73.5	65.3	84.6	69.7
2000	48	72.1	71.0	76.6	72.1
2001	57	73.7	72.0	79.0	72.3
2002	87	75.6	75.5	76.4	77.1
2003	80	72.4	72.3	75.8	72.4
2004	87	73.3	73.0	79.8	73.3
2005	102	76.4	73.9	79.4	75.9
2006	99	74.0	72.4	82.4	73.7
2007	102	76.4	75.2	80.5	76.4
2008	113	75.5	74.6	80.9	75.3
2009	92	78.7	76.6	84.0	78.7
2010	112	77.5	76.9	79.6	77.6
2011	110	76.3	75.9	79.1	76.1
2012	124	77.5	76.9	81.4	77.6
2013	124	75.3	74.2	82.6	75.3
2014	124	78.8	76.3	83.6	77.8
2015	115	78.4	77.0	83.1	78.1
2016	125	80.1	79.6	80.7	80.0
2017	122	80.0	79.1	84.5	78.4
2018	102	76.4	74.0	80.6	72.5
2019	80	79.3	79.4	79.0	79.3
1998–2019	2094	76.9	75.5	80.8	76.4

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 10b

Medians of age at death according to the grouping in Table 9
FEMALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	38	79.6	79.5	80.7	79.2
1999	28	80.2	76.5	84.6	78.3
2000	25	83.1	77.6	87.1	82.9
2001	56	78.3	76.4	81.0	77.8
2002	66	80.8	74.9	88.7	79.2
2003	63	79.1	77.5	85.2	78.6
2004	53	78.4	76.9	84.8	77.5
2005	68	80.2	78.0	89.3	79.8
2006	63	77.8	77.5	81.7	77.5
2007	82	81.1	77.5	86.9	81.1
2008	72	82.3	80.0	90.1	81.8
2009	66	79.5	77.3	83.5	79.5
2010	72	82.3	82.1	89.6	82.3
2011	72	80.9	76.9	84.3	79.4
2012	79	79.3	78.9	84.2	78.9
2013	74	82.1	81.7	86.9	82.2
2014	75	82.4	80.3	86.4	82.1
2015	81	78.5	76.5	84.9	76.7
2016	75	79.9	77.5	81.4	78.5
2017	86	83.2	79.9	85.6	81.6
2018	39	80.3	77.7	81.1	84.5
2019	31	80.1	79.4	81.8	83.0
1998–2019	1364	80.4	78.1	85.0	79.5

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 11a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	31	2.8	0.35	2.0	0.34	2.7	0.35	3.3	0.36
1999	23	2.1	0.32	1.8	0.38	2.0	0.34	2.4	0.33
2000	33	2.9	0.39	2.2	0.39	2.8	0.40	3.4	0.43
2001	39	3.4	0.38	2.0	0.30	3.0	0.36	4.1	0.43
2002	71	3.8	0.41	2.1	0.32	3.2	0.39	4.6	0.47
2003	66	3.5	0.40	2.0	0.32	3.0	0.38	4.0	0.42
2004	75	4.0	0.42	2.2	0.32	3.3	0.39	4.4	0.45
2005	82	4.3	0.46	2.4	0.35	3.5	0.42	4.8	0.47
2006	78	4.1	0.43	2.1	0.31	3.1	0.37	4.2	0.43
2007	82	3.7	0.42	2.0	0.36	2.9	0.40	4.0	0.44
2008	93	4.2	0.51	2.0	0.34	3.1	0.45	4.3	0.53
2009	80	3.6	0.44	1.7	0.35	2.6	0.41	3.6	0.46
2010	88	3.9	0.49	1.6	0.32	2.6	0.41	3.9	0.50
2011	89	4.0	0.50	1.8	0.34	2.8	0.43	3.9	0.52
2012	93	4.1	0.50	1.9	0.34	2.8	0.44	4.0	0.50
2013	92	4.0	0.53	1.8	0.37	2.7	0.45	3.7	0.52
2014	87	3.7	0.58	1.5	0.41	2.4	0.49	3.4	0.58
2015	89	3.7	0.64	1.7	0.57	2.5	0.60	3.4	0.65
2016	90	3.7	0.71	1.3	0.51	2.2	0.59	3.3	0.69
2017	84	3.5	0.69	1.2	0.55	2.0	0.60	3.0	0.69
2018	47	1.9	0.81	0.9	0.77	1.4	0.81	1.7	0.79
2019	39	1.6	1.44	0.6	1.04	1.0	1.22	1.3	1.35
1998-2019	1551	3.5	0.50	1.7	0.37	2.6	0.44	3.5	0.51

Table 11b

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
FEMALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	18	1.5	0.28	0.6	0.21	0.9	0.23	1.2	0.25
1999	21	1.8	0.32	0.8	0.18	1.1	0.23	1.4	0.29
2000	13	1.1	0.24	0.7	0.24	0.8	0.23	0.9	0.23
2001	30	2.5	0.38	0.9	0.23	1.5	0.30	2.0	0.37
2002	48	2.5	0.38	1.2	0.37	1.6	0.38	2.0	0.39
2003	51	2.6	0.50	1.1	0.34	1.6	0.42	2.1	0.50
2004	45	2.3	0.38	1.0	0.30	1.4	0.32	1.8	0.37
2005	58	2.9	0.54	1.0	0.31	1.6	0.41	2.2	0.48
2006	50	2.5	0.48	1.0	0.33	1.4	0.39	2.0	0.47
2007	59	2.6	0.41	1.0	0.25	1.5	0.31	1.9	0.37
2008	60	2.6	0.48	1.0	0.31	1.4	0.38	1.9	0.44
2009	52	2.2	0.38	1.0	0.29	1.4	0.33	1.8	0.38
2010	58	2.5	0.47	0.9	0.30	1.3	0.36	1.8	0.44
2011	50	2.1	0.39	0.9	0.28	1.2	0.33	1.6	0.38
2012	67	2.8	0.50	1.0	0.25	1.4	0.34	2.0	0.44
2013	54	2.3	0.46	0.8	0.29	1.2	0.34	1.6	0.41
2014	51	2.1	0.62	0.9	0.64	1.2	0.62	1.5	0.59
2015	55	2.3	0.62	0.9	0.53	1.2	0.55	1.7	0.62
2016	48	2.0	0.56	0.7	0.58	1.0	0.56	1.4	0.57
2017	57	2.3	0.70	0.6	0.57	1.0	0.60	1.5	0.64
2018	20	0.8	0.43	0.2	0.26	0.4	0.31	0.5	0.35
2019	17	0.7	0.81	0.2	0.46	0.3	0.56	0.5	0.65
1998-2019	982	2.1	0.46	0.8	0.32	1.2	0.37	1.6	0.43

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	3	0.2	0.2			0.0	3	0.5	0.5
5-9	9	0.5	0.7	5	0.5	0.5	4	0.6	1.1
10-14	10	0.6	1.3	2	0.2	0.7	8	1.2	2.3
15-19	8	0.5	1.8	5	0.5	1.1	3	0.5	2.8
20-24	11	0.6	2.4	8	0.8	1.9	3	0.5	3.2
25-29	8	0.5	2.9	6	0.6	2.5	2	0.3	3.5
30-34	15	0.9	3.8	8	0.8	3.2	7	1.1	4.6
35-39	15	0.9	4.6	9	0.9	4.1	6	0.9	5.6
40-44	21	1.2	5.9	15	1.4	5.5	6	0.9	6.5
45-49	20	1.2	7.1	10	0.9	6.5	10	1.5	8.0
50-54	29	1.7	8.8	20	1.9	8.4	9	1.4	9.4
55-59	60	3.5	12.3	42	4.0	12.3	18	2.8	12.2
60-64	89	5.2	17.5	58	5.5	17.9	31	4.8	17.0
65-69	149	8.8	26.3	99	9.4	27.3	50	7.7	24.7
70-74	250	14.7	41.0	166	15.8	43.0	84	13.0	37.7
75-79	328	19.3	60.3	223	21.2	64.2	105	16.2	53.9
80-84	326	19.2	79.4	198	18.8	83.0	128	19.8	73.6
85+	350	20.6	100.0	179	17.0	100.0	171	26.4	100.0
All ages	1701	100.0		1053	100.0		648	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**incl. multiple malignancies**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		3			0.2	0.08		18.8
5- 9	5	4	0.3	0.16	0.3	0.13	20.0	17.4
10-14	2	8	0.1	0.09	0.6	0.47	7.4	34.8
15-19	5	3	0.3	0.22	0.2	0.20	10.6	12.0
20-24	8	3	0.4	0.47	0.2	0.30	11.9	7.7
25-29	6	2	0.3	0.46	0.1	0.17	7.1	2.2
30-34	8	7	0.4	0.50	0.3	0.44	6.3	4.4
35-39	9	6	0.4	0.38	0.3	0.43	3.7	1.6
40-44	15	6	0.6	0.44	0.3	0.19	2.6	0.7
45-49	10	10	0.4	0.14	0.4	0.38	0.7	0.6
50-54	20	9	0.9	0.21	0.4	0.21	0.8	0.4
55-59	42	18	2.2	0.34	0.9	0.25	1.0	0.5
60-64	58	31	3.6	0.42	1.8	0.33	1.0	0.7
65-69	99	50	6.5	0.42	3.0	0.38	1.2	0.8
70-74	166	84	11.8	0.55	5.2	0.50	1.5	1.0
75-79	223	105	20.1	0.81	7.6	0.64	2.0	1.2
80-84	198	128	30.2	0.89	13.1	0.83	2.1	1.5
85+	179	171	42.0	0.92	17.7	0.62	2.2	1.6
All ages	1053	648					1.6	1.1
Mortality								
Raw			3.5	0.56	2.1	0.49		
WS			1.5	0.40	0.8	0.34		
ES			2.3	0.48	1.1	0.39		
BRD-S			3.3	0.56	1.5	0.46		
PYLL-70								
per 100,000			15.5		11.0			
ES			15.0		11.9			
AYLL-70			14.3		18.0			

Table 14a

Further malignancies in deaths in period 1998–2019
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	8	0.8	2	25.0	2	25.0	4	50.0
C07–C08	Salivary gland	6	0.6			2	33.3	4	66.7
C09–C10	Oropharynx	2	0.2	1	50.0			1	50.0
C12–C13	Hypopharynx	3	0.3			1	33.3	2	66.7
C15	Oesophagus	10	1.0	3	30.0	1	10.0	6	60.0
C16	Stomach	25	2.5	4	16.0	4	16.0	17	68.0
C17	Small intestine	2	0.2			1	50.0	1	50.0
C18	Colon	62	6.3	20	32.3	7	11.3	35	56.5
C19–C20	Rectum	38	3.9	13	34.2	6	15.8	19	50.0
C22	Liver	8	0.8			1	12.5	7	87.5
C23–C24	Bile	2	0.2	1	50.0			1	50.0
C25	Pancreas	16	1.6			4	25.0	12	75.0
C26	GI cancer	1	0.1			1	100.0		
C30–C31	Sinuses	1	0.1	1	100.0				
C32	Larynx	8	0.8	6	75.0	1	12.5	1	12.5
C33–C34	Lung	89	9.0	10	11.2	19	21.3	60	67.4
C38,C45	Mesothelioma	2	0.2					2	100.0
C40–C41	Bone	1	0.1	1	100.0				
C43	Malign. melanoma	48	4.9	18	37.5	3	6.3	27	56.3
C44	Skin others	281	28.6	34	12.1	18	6.4	229	81.5
C46,C49	Soft tissue	15	1.5	5	33.3	1	6.7	9	60.0
C50	Breast	3	0.3	1	33.3			2	66.7
C60	Penis	2	0.2					2	100.0
C61	Prostate	160	16.3	80	50.0	16	10.0	64	40.0
C62	Testis	6	0.6	4	66.7			2	33.3
C64	Kidney	24	2.4	10	41.7	1	4.2	13	54.2
C65	Renal pelvis	2	0.2					2	100.0
C66	Ureter	2	0.2			1	50.0	1	50.0
C67	Bladder	32	3.3	11	34.4	4	12.5	17	53.1
C68	Urethra	1	0.1			1	100.0		
C69	Eye melanoma	1	0.1	1	100.0				
C70–C72	CNS cancer	11	1.1	1	9.1	1	9.1	9	81.8
C73	Thyroid	2	0.2	1	50.0			1	50.0
C74–C80	Cancer others	1	0.1					1	100.0
C76–C79	CUP	10	1.0			1	10.0	9	90.0
C81	Hodgkin lymphoma	14	1.4	4	28.6	2	14.3	8	57.1
C82–C85	NHL	58	5.9	8	13.8	6	10.3	44	75.9
C90	Mult. myeloma	8	0.8	2	25.0	3	37.5	3	37.5
C91–C96	Leukaemia	19	1.9	1	5.3	3	15.8	15	78.9
All further malignancies		984	100.0	243	24.7	111	11.3	630	64.0

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 14b

Further malignancies in deaths in period 1998–2019
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C00	Lip	1	0.2					1	100.0
C03–C06	Oral cavity	1	0.2					1	100.0
C07–C08	Salivary gland	2	0.5	1	50.0			1	50.0
C09–C10	Oropharynx	1	0.2					1	100.0
C12–C13	Hypopharynx	1	0.2	1	100.0				
C15	Oesophagus	1	0.2			1	100.0		
C16	Stomach	9	2.2	1	11.1	4	44.4	4	44.4
C17	Small intestine	1	0.2			1	100.0		
C18	Colon	29	7.0	12	41.4	4	13.8	13	44.8
C19–C20	Rectum	12	2.9	7	58.3	1	8.3	4	33.3
C21	Anus/canal	2	0.5					2	100.0
C22	Liver	4	1.0	1	25.0			3	75.0
C23–C24	Bile	3	0.7	1	33.3	1	33.3	1	33.3
C25	Pancreas	13	3.1					13	100.0
C30–C31	Sinuses	1	0.2	1	100.0				
C33–C34	Lung	27	6.5	2	7.4	4	14.8	21	77.8
C40–C41	Bone	1	0.2	1	100.0				
C43	Malign. melanoma	17	4.1	8	47.1			9	52.9
C44	Skin others	86	20.7	33	38.4	4	4.7	49	57.0
C46,C49	Soft tissue	3	0.7	1	33.3			2	66.7
C48	Peritoneal	2	0.5	1	50.0			1	50.0
C50	Breast	79	19.0	46	58.2	7	8.9	26	32.9
C51	Vulva	4	1.0	4	100.0				
C53	Cervix uteri	6	1.4	5	83.3			1	16.7
C54	Corpus uteri	12	2.9	7	58.3	1	8.3	4	33.3
C55,C57	Fem. genitals un	1	0.2					1	100.0
C56	Ovary	13	3.1	3	23.1	3	23.1	7	53.8
C64	Kidney	13	3.1	4	30.8	3	23.1	6	46.2
C65	Renal pelvis	1	0.2					1	100.0
C67	Bladder	4	1.0	3	75.0	1	25.0		
C68	Urethra	1	0.2			1	100.0		
C69	Eye lymphoma	2	0.5	1	50.0			1	50.0
C69	Eye melanoma	1	0.2	1	100.0				
C70–C72	CNS cancer	11	2.6	2	18.2	3	27.3	6	54.5
C73	Thyroid	5	1.2	4	80.0			1	20.0
C74–C80	Cancer others	1	0.2	1	100.0				
C76–C79	CUP	5	1.2	2	40.0			3	60.0
C81	Hodgkin lymphoma	2	0.5	2	100.0				
C82–C85	NHL	27	6.5	1	3.7	2	7.4	24	88.9
C90	Mult. myeloma	3	0.7			1	33.3	2	66.7
C91–C96	Leukaemia	8	1.9	1	12.5	2	25.0	5	62.5

Table 14b

Further malignancies in deaths in period 1998–2019
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
All further malignancies	416	100.0	158	38.0	44	10.6	214	51.4

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		3			0.2	0.08		20.0
5- 9	5	4	0.3	0.16	0.3	0.14	20.8	17.4
10-14	2	8	0.1	0.09	0.6	0.47	7.4	42.1
15-19	5	2	0.3	0.22	0.1	0.14	11.1	8.7
20-24	8	3	0.4	0.47	0.2	0.30	13.3	8.1
25-29	5	2	0.2	0.42	0.1	0.17	6.5	2.3
30-34	8	7	0.4	0.50	0.3	0.44	6.5	5.0
35-39	9	6	0.4	0.38	0.3	0.46	4.0	1.8
40-44	13	5	0.6	0.42	0.2	0.18	2.5	0.7
45-49	9	9	0.4	0.13	0.4	0.41	0.7	0.7
50-54	16	8	0.7	0.18	0.3	0.23	0.7	0.4
55-59	39	13	2.0	0.35	0.7	0.24	1.1	0.4
60-64	41	24	2.5	0.41	1.4	0.32	0.8	0.6
65-69	72	37	4.7	0.40	2.2	0.38	1.0	0.7
70-74	134	68	9.6	0.66	4.2	0.54	1.6	1.1
75-79	174	75	15.7	0.97	5.4	0.71	2.1	1.1
80-84	148	98	22.5	1.02	10.1	0.89	2.2	1.5
85+	121	139	28.4	0.98	14.4	0.62	2.0	1.6
All ages	809	511					1.6	1.1
Mortality								
Raw			2.7	0.57	1.6	0.50		
WS			1.2	0.38	0.6	0.33		
ES			1.8	0.48	0.9	0.39		
BRD-S			2.5	0.57	1.2	0.46		
PYLL-70								
per 100,000			13.9		10.0			
ES			13.6		11.0			
AYLL-70			15.9		20.0			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		3			0.2	0.08		20.0
5- 9	5	4	0.3	0.16	0.3	0.14	20.8	17.4
10-14	2	7	0.1	0.10	0.5	0.44	7.4	36.8
15-19	5	2	0.3	0.23	0.1	0.14	11.1	9.1
20-24	6	3	0.3	0.35	0.2	0.30	10.0	8.3
25-29	3	2	0.1	0.25	0.1	0.17	3.9	2.4
30-34	8	7	0.4	0.53	0.3	0.44	6.5	5.1
35-39	7	6	0.3	0.32	0.3	0.46	3.1	1.8
40-44	10	5	0.4	0.32	0.2	0.19	1.9	0.7
45-49	7	7	0.3	0.11	0.3	0.37	0.6	0.5
50-54	14	6	0.6	0.18	0.3	0.21	0.6	0.3
55-59	29	12	1.5	0.29	0.6	0.26	0.8	0.4
60-64	20	17	1.2	0.24	1.0	0.29	0.4	0.5
65-69	41	27	2.7	0.31	1.6	0.36	0.6	0.5
70-74	82	49	5.9	0.63	3.1	0.48	1.0	0.8
75-79	99	49	8.9	0.69	3.6	0.60	1.2	0.7
80-84	91	76	13.9	0.76	7.8	0.75	1.4	1.2
85+	84	111	19.7	0.72	11.5	0.53	1.5	1.3
All ages	513	393					1.1	0.9
Mortality								
Raw			1.7	0.43	1.3	0.44		
WS			0.8	0.29	0.5	0.29		
ES			1.2	0.36	0.7	0.35		
BRD-S			1.6	0.43	0.9	0.40		
PYLL-70								
per 100,000			11.0		9.1			
ES			11.1		10.2			
AYLL-70			18.6		22.1			

* See corresponding tables with multiple malignancies.

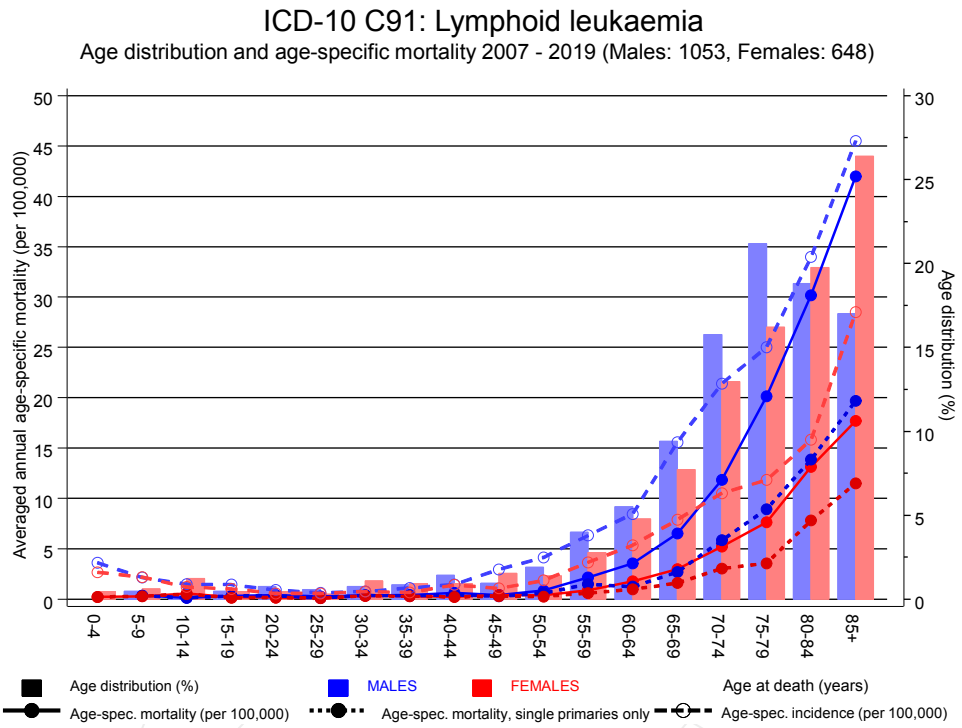


Figure 17. Distribution of age at death (bars; males: mean=66.9 yrs, median=69.1 yrs; females: mean=69.4 yrs, median=72.9 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at lymphoid leukaemia-related death (see Table 10) should be considered.

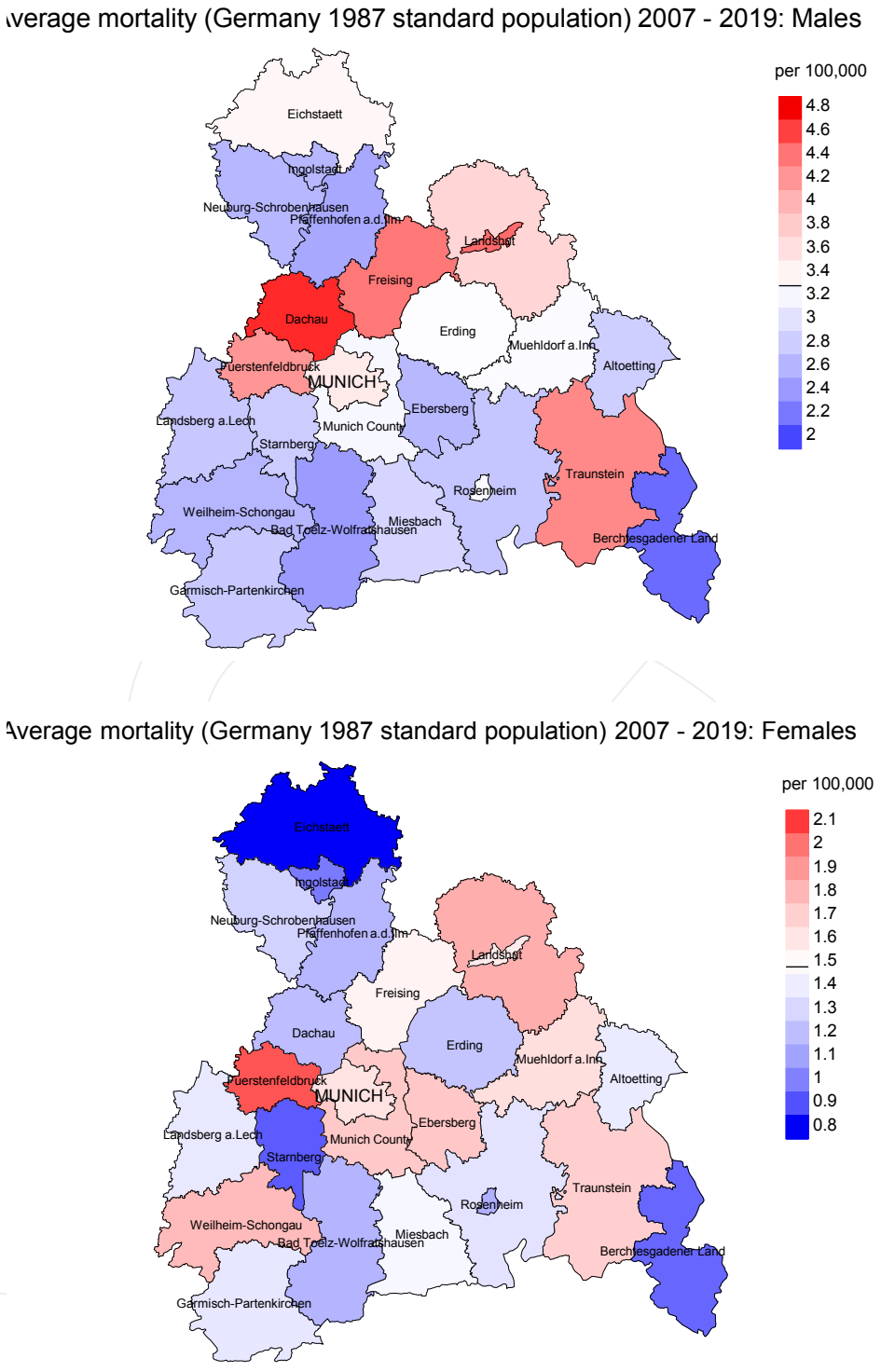
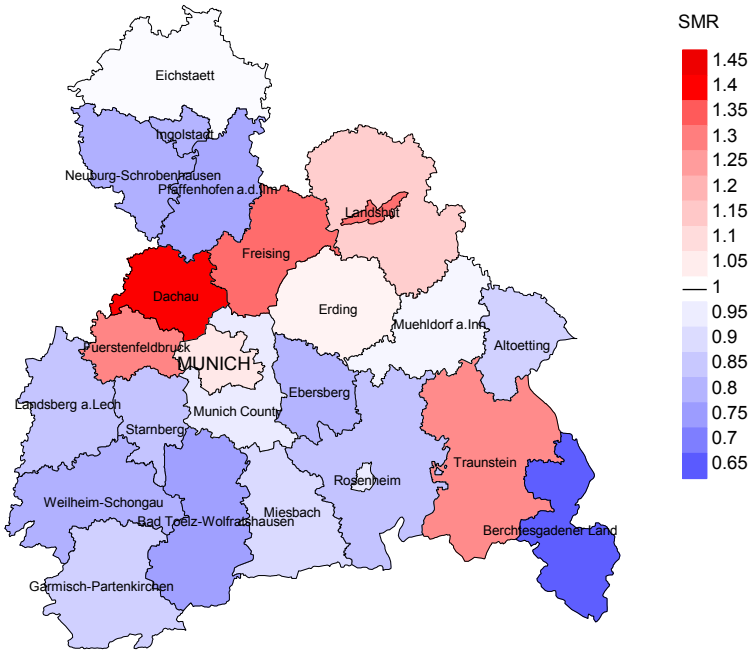


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.3/100,000 WS N=1,053, females 1.5/100,000 WS N=648).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 21 women died from lymphoid leukaemia. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.9 and 3.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

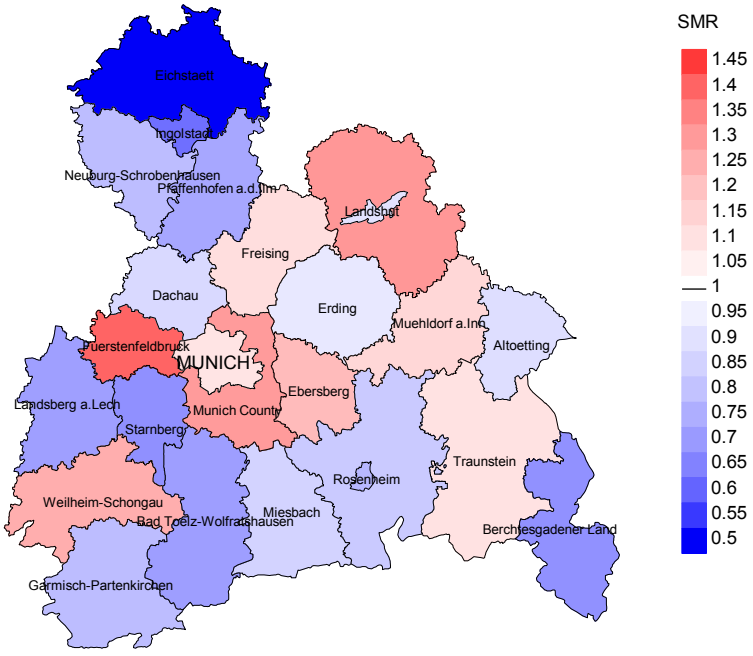


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,053, females N=648).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 21 women died from lymphoid leukaemia. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.22. Though, the value of this parameter may vary with an underlying probability of 99% between 0.64 and 2.08, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head&neck and lung).

The ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MIR. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

MCR	Munich Cancer Registry (Tumorregister München)
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
SEER	Surveillance, Epidemiology, and End Results (USA)
DCO	Death certificate only
BRD-S	German (FRG) standard population
ES	European standard population (old)
WS	World standard population
SIR	Standardized incidence ratio
CI	Confidence interval
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
SMR	Standardized mortality ratio
MI-index	Ratio of mortality to incidence, MIR
FRG	Federal Republic of Germany

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